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# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

### (PCT Article 36 and Rule 70)

| Applicant's or agent's file reference<br><br>SUZ-E-18441 | **FOR FURTHER ACTION** | See Notification of Transmittal of International<br>Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| International application No.<br>PCT/JP00/05199 | International filing date *(day/month/year)*<br>03/08/2000 | Priority date *(day/month/year)*<br>05/08/1999 |
| International Patent Classification (IPC) or national classification and IPC<br>G10H1/00 | | |
| Applicant<br><br>YAMAHA CORPORATION et al | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 30 sheets.

3. This report contains indications relating to the following items:

   I   ☒  Basis of the report
   II  ☐  Priority
   III ☒  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   IV  ☐  Lack of unity of invention
   V   ☐  Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   VI  ☐  Certain documents cited
   VII ☒  Certain defects in the international application
   VIII ☒  Certain observations on the international application

| Date of submission of the demand<br><br>23/02/2001 | Date of completion of this report<br><br>06.11.2001 |
|---|---|
| Name and mailing address of the international<br>preliminary examining authority:<br><br>European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0  Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized officer<br><br>Naumann, O<br><br>Telephone No. +49 89 2399 7468 |

## I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
**Description, pages:**

| | | | | |
|---|---|---|---|---|
| 2-11,18-20,22-25, 28-30,32-44 | as originally filed | | | |
| 1,12-17,21,26,27, 31 | as received on | 12/10/2001 | with letter of | 10/10/2001 |

**Claims, No.:**

| | | | | |
|---|---|---|---|---|
| 1-26 | as received on | 12/10/2001 | with letter of | 10/10/2001 |

**Drawings, sheets:**

| | |
|---|---|
| 1/10-10/10 | as originally filed |

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language:   , which is:

☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

    ☐   the description,    pages:

    ☐   the claims,    Nos.:

    ☐   the drawings,    sheets:

5. ☐   This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

    *(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

    ☐   the entire international application.

    ☒   claims Nos. 1-26.

because:

    ☐   the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination *(specify)*:

    ☒   the description, claims or drawings *(indicate particular elements below)* or said claims Nos. 1-26 are so unclear that no meaningful opinion could be formed *(specify)*:
       **see separate sheet**

    ☐   the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

    ☐   no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

    ☐   the written form has not been furnished or does not comply with the standard.

    ☐   the computer readable form has not been furnished or does not comply with the standard.

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
**see separate sheet**


**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
**see separate sheet**

## Re Item I
**Basis of the report**

As far as can be understood, the changes of the amended claims are based on the application as originally filed.

## Re Item III
**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

It is not possible to identify the subject-matter which should represent the invention. This is due to a lack of conciseness and clarity as laid out under Re VIII herein below.

## Re Item VII
**Certain defects in the international application**

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document
     D1:   EP-A-0 837 451 (YAMAHA CORP) 22 April 1998 (1998-04-22)
 is not mentioned in the description, nor is this  document identified therein.

## Re Item VIII
**Certain observations on the international application**

The application contains 15 independent claims, with
     5 independent claims of the category "apparatus"
     5 independent claims of the category "method"
     5 independent claims of the category "medium".

Although the claims in the respective categories have been drafted as separate independent claims, they relate effectively to the same subject-matter and differ from each other only with regard to the definition of the subject-matter for which protection is

sought and/or in respect of the terminology used for the features of that subject-matter.

The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 1, 3, 6, 12, 14, and 17 to 26 do not meet the requirements of Article 6 PCT.

In order to avoid this deficiency, it would have been necessary to file an amended set of claims defining the relevant subject-matter in terms of a minimum number of independent claims (preferably a single independent claim in each category) followed by dependent claims covering features which are merely optional (Rules 6.4(a) PCT).

## Additional Comments

### Common general inventive concept

No appropriate reasons have been given by the applicant why he considers more than one than one independent claim as necessary. It is therefore also highly questionable that the subject-matter of these independent claims is linked by a common, general, and most of all **inventive** concept as necessary in view of Rule 13.1 PCT.

The subject-matter of the application seems to be, according to

**Claim 1:**   A music reproducing apparatus

**Claim 3:**   An telephony terminal apparatus comprising a music reproducing apparatus as claimed in claim 1.

**Claim 6:**   A telephony terminal apparatus comprising a music reproducing apparatus as claimed in claim 1.

**Claim 12:**   A music reproducing apparatus as claimed in claim 1 (timbre data memory not required) further comprising a memory monitor.

**Claim 14:**   An electronic apparatus as claimed in claim 3 (timbre data memory not required) further comprising a memory monitor.

The other independent claims are corresponding method claims or claims related to a medium for a program for the operation of an apparatus as claimed in any of the above

claims.

**Relation to prior art - Novelty**

As far as can be understood at this initial stage of the examination procedure, it appears that all independent claims do not fulfill the requirements of Art. 33 (1) PCT because they are not novel in the sense of Art. 33 (2) PCT.

Claims 1, 12, 22, and 25 have been amended and now deal with a "music reproducing apparatus **for use** in a telephony terminal apparatus [...]". However, this specification has to be read as "music reproducing apparatus **suitable for use** in a telephony terminal apparatus [...]" and therefore does not define any other subject-matter than in the claims as originally filed.

An apparatus that therefore falls within the scope of any of the aforementioned claims is an ensemble of a computer, such as the Atari ST or common PCs, in conjunction with standard MIDI-programs, which are in widespread use since the 1980s. Such computers standardly have had access to the Internet at least since the mid-1990s, therefore they also were telephony terminals as defined in claim 6. An example of such an ensemble is described in the document D1.

It does not appear that the other independent claims and dependent claims define subject-matter that would not be anticipated by such an ensemble as described above.

**Patentable subject-matter**

It does not appear to have been entirely impossible that a limitation to the domain of portable telephones with their characteristic restrictions in memory, size and data transfer rate might have resulted in a set of claims fulfilling the requirement of novelty, at least on the basis of the documents available at the time of search.

PTO/PCT Rec'd 05 FEB 2002

REPLACE
ART 34 A

# MUSIC REPRODUCING APPARATUS, MUSIC REPRODUCING METHOD AND

# TELEPHONE TERMINAL DEVICE

5                           SPECIFICATION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a music reproducing
apparatus and a music reproducing method suitable for use in
10    a car telephone or potable telephone.

Related Art

In portable telephone systems such as PDC (Personal
Digital Cellular Telecommunication System) known as analog or
digital cellular systems, or PHS (Personal Handy-Phone
15    Systems), a telephone terminal device rings to alert a user
at the time of arrival of a call. Conventionally, the alert
was made by beeping sound, but it has recently replaced by a
melody because the beeping sound is a kind of noise offensive
to the ear.

20         The above-mentioned type of conventional telephone
terminal device can generate a melody, but the melody is far
from satisfactory quality.

To solve this problem, the use of a music piece
reproducing apparatus with an automatic performance function
25    has been considered effective. Such a conventional music
piece reproducing apparatus capable of automatic performance
includes a central processing unit (CPU), a read only memory

example, due to low speed of data processing by the data

processing means, the telephone terminal device can reproduce

a piece of music with a variety of tones of high quality.

Further, since the amount of timbre data is reduced, timbre

5    data enough to reproduce a piece of music with tones of high

quality can be stored even in a timbre data storage means,

the storage capacity of which is smaller.

According to another aspect of the present invention,

when a vacant area is created in the musical score storing

10   memory, a next portion of the musical score data is

subsequently loaded into the memory.  By such a construction,

a music piece of a high quality requiring a great data volume

can be reproduced even though the music score storing memory

has a small capacity.

15       Further, the CPU is not required to execute the music

reproduction process, but simply executes a data transfer

process of feeding a next portion of the music score data

when a vacant area is yielded in the memory buffering the

music score data.  Therefore, the CPU of moderate speed may

20   be sufficient to reproduce the high quality of the melody

tones.


## BRIEF DESCRIPTION OF THE DRAWINGS

By way of example and to make the description more clear,

25   reference is made to the accompanying drawings, in which:

Fig. 1 is a diagram showing the concept of how to

download music data to potable telephones when a music piece

reproducing apparatus of the present invention that embodies

a music piece reproducing method of the present invention is applied to the potable telephones;

Fig. 2 is a diagram showing an embodiment of a music piece reproducing apparatus of the present invention that embodies a music piece reproducing method of the present invention when the music piece reproducing apparatus is applied to a potable telephone;

Fig. 3 is a diagram showing an exemplary configuration of a music piece reproducing unit as practiced in the music piece reproducing apparatus of the present invention that embodies the music piece reproducing method of the present invention;

Fig. 4 is a diagram showing an example of a musical score data format used in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 5 is a diagram showing an example of a timbre data format for eight tone colors written in a timbre data storage unit (Voice RAM) in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 6 is a diagram showing an example of a format of timbre allocation data used in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 7 is a diagram showing the detailed arrangement of an FIFO in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 8 is a diagram for explaining the operation of the

FIFO in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 9 is a flowchart showing music piece reproduction support processing executed by a system CPU in a potable telephone to which the music piece reproducing apparatus of the present invention is applied;

Fig. 10 is a diagram showing a configuration of a frequency modulation type of tone generator as an example of the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 11 is a diagram showing a configuration of another frequency modulation type of tone generator as an example of the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 12 is a diagram showing an example of a timbre data format for eight tone colors written in the timbre data storage unit (Voice RAM) by using a frequency modulation type of tone generator as the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention; and

Fig. 13 is a diagram showing a detailed format of the timbre data shown in Fig. 12.


DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 is a diagram showing the concept of how to download music data to potable telephones as telephone terminal devices when a music piece reproducing apparatus of the present invention that embodies a music piece reproducing

method of the present invention is applied to the potable
telephones.

Systems for potable telephones are typically adopting
cellular or cell splitting methods that install many radio-
zones called cells in a service area. Each radio-zone is
managed by one of cell sites or base stations A (2a) through
D (2d). When users make calls from potable telephones 1 and
101 as mobile stations to ordinary telephones, the calls are
first connected to a mobile telephone exchange station
through a base station that manages the radio-zone to which
the potable telephones now belong, then from the mobile
telephone exchange station to a general telephone network.
The potable telephones 1, 101 are connected through radio
channels to the base station responsible for the radio-zone
so that they can make calls to other telephones.

Fig. 1 shows an example of this type of cellular system.
Shown in Fig. 1 is a case where the potable telephones 1, 101
are located within a radio-zone managed by a base station
C(2c) in the base stations A(2a) through D(2d). The potable
telephones 1, 101 are connected to the base station 2c
through radio channels so that the base station 2c will
receive and process upward signals when the telephones make
calls or perform location registration. Although the base
stations 2a through 2d are responsible for different radio-
zones, the outer edges of the base stations may overlap each
other. The base stations 2a through 2d are connected to a
mobile exchange station 3 through a multiplexing network, and
plural mobile exchange stations are consolidated by a gate

exchange station 4, then connected to a general telephone
exchange station 5a.  Plural gate exchange stations 4
provided in this system are connected to each other through a
relay transmission line.  general telephone exchange stations
5   5 a, 5b, 5c, are located at each local area with a relay
transmission line connecting them.  Each of the general
telephone exchange stations 5a, 5b, 5c, establishes
connection with ordinary telephones.  Then, in this case, a
download center 6 is connected to the general telephone
10   exchange station 5b.

At the download center 6, new pieces of music are
collected at any time and a large number of music data are
stored.  According to the present invention, music data can
be downloaded to the potable telephones 1, 101 from the
15   download center 6 that is connected to the general telephone
network.  When the potable telephone 1 downloads music data,
the user carrying the potable telephone 1 dials a telephone
number of the download center 6, so that the potable
telephone 1 is connected to the download center 6 in a path
20   from the potable telephone 1 to the download center 6 through
the base station 20, the mobile exchange station 3, the gate
exchange station 4, the general telephone exchange station 5a
and the general telephone exchange station 5b.  Then, the
user operates dial buttons and the like on the potable
25   telephone 1 according to the menu indicated on its display to
download music data associated to a desired music title.  In
this case, the music data is composed of musical score data
and timbre data.  Using the above-mentioned method, only the

timbre data indicative of a variety of tones or the musical

score data may be downloaded to the potable telephone 1

individually.

Fig. 2 illustrates an embodiment of a music piece

5   reproducing apparatus of the present invention that embodies

a music piece reproducing method of the present invention

when the music piece reproducing apparatus is applied to a

potable telephone as a telephone terminal device.

In Fig. 2, the potable telephone 1 includes an antenna

10  1a that is generally retractable. The antenna 1a is

connected to a communication unit 13 having modulation and

demodulation functions. A central processing unit (CPU) 10

of the system is a system control part that executes

telephone function programs to control the operation of each

15  part in the potable telephone 1. The system CPU 10 has a

timer that measures an elapsed time in operation and

generates a timer interrupt at certain intervals. Upon

receipt of an interrupt request signal, the system CPU 10

executes auxiliary operations to support music piece

20  reproduction processing to be described later. A system RAM

11 is a RAM (Random Access Memory) that provides a storage

area for music data composed of musical score data and timbre

data downloaded from the download center 6, a user setting

data storage area, a work area for the system CPU 10, and so

25  on. A system ROM 12 is a ROM (Read Only Memory) that stores

several kinds of telephone function programs, such as to

handle outgoing and incoming calls, executed by the system

CPU 10, other programs for execution of auxiliary operations

34 is set according to the timbre allocation data so that each part will generate a music signal with the pitch and the duration of tone generation determined according to the timbre parameters supplied from the sequencer 33. The music signals generated for four parts are supplied to a digital/analog converter (DAC) 36 at predetermined reproduction timing to generate an analog music signal. The music signal is then decoded at the voice data processing unit 14 and mixed with a receiver signal by means of a mixer 37.

The following describes the operation of the music piece reproducing unit shown in Fig. 3. The user carrying the potable telephone 1 as shown in Fig. 2 selects a desired piece of music from information related to music such as music titles displayed on the display 18 in a music piece reproducing mode. Then, music data corresponding to the selected piece are read out of the system RAM 11 and sent to the music piece reproducing unit 15 through the bus 24. Of the timbre data of eight tone colors in the music data fetched through the interface 30, index data attached to the timbre data are decoded at the index decoder 32 and supplied and written as index data AD2 to the timbre data storage unit (Voice RAM) 34. The timbre data to be written to the timbre data storage unit (Voice RAM) 34 can be selected from many kinds of timbre data stored in the system RAM 11 before transfer.

Fig. 5 illustrates an example of a timbre data format for eight tone colors written in the timbre data storage unit

the musical score data are read out of the FIFO 31, so that the music signals reproduced from the tone generator 35 are outputted to the DAC 36.

As the piece of music is reproducing, the interrupt
5   request signal (IRQ) is given to the system CPU 10 each time an available area detected in the FIFO 31 becomes equal to the IRQ point data value. Upon receipt of the IRQ, the system CPU 10 reads the next musical score data for a predetermined number of words (31-IRQ point) from the system
10  RAM 11, and sends the same to the bus 24. The musical score data are written into the available area in the FIFO 31 through the interface 30. Such write operation as to write the next musical score data for the predetermined number of words (31-IRQ point) into the FIFO 31 is repeatedly executed.
15  Therefore, even if the musical score data contain many words of data, all the data words can be written in the FIFO 31 after all. The musical score data read out of the FIFO 31 are then reproduced and outputted from the tone generator 35 according to the tempo data. Thus, according to the present
20  invention, a large amount of music data can be treated that allow the music piece to be reproduced with high quality even in a case where the FIFO 31 has such a small storage capacity, for example, only 32 words of music data.

Suppose that the music piece reproducing unit 15 is set
25  to reproduce a piece of music when a call arrives at the potable telephone 1. When a call arrives at the potable telephone 1, the above-mentioned music piece reproduction processing is so executed that a music signal outputted from

Timbre parameters corresponding to the timbre number are read out of the timbre data storage unit (Voice RAM) 34, and set in a tone generator register of the tone generator 35 for the part specified by the timbre allocation data. The timbre of

5   the part concerned to be reproduced on the tone generator 35 is thus changed during the reproduction.

As discussed above, since the timbre allocation data for each part is inserted in the musical score data, the timbre of each part can be voluntarily changed during the

10  reproduction. Further, the timbre data of eight tone colors stored in the timbre data storage unit (Voice RAM) 34 may be selected by the user out of all the timbre data stored in the system RAM 11, so that the selected timbre data can be transferred to the timbre data storage unit (Voice PAM) 34.

15  Since the system RAM 11 has many kinds of timbre data downloaded from the download center 6 or the external equipment 20, any timbre data from among the timbre data of many kinds can be selectively stored into the timbre data storage unit (Voice RAM) 34.

20      Fig. 9 is a flowchart illustrating music piece reproduction support processing executed by the system CPU 10 during the reproduction of a piece of music. When the potable telephone 1 is changed to the music piece reproducing mode, a music piece reproducing menu appears on the display

25  18. In step S1, the user selects a desired piece of music from the music selection menu by operating the dial buttons and the like. In this case, the selection is made from music data stored in the system RAM 11 and the system ROM 12. The

CLAIMS

1. A music reproducing apparatus comprising:

   a timbre data memory that has a limited capacity for
5   storing timbre data corresponding to a first number of
   timbres, which is less than a second number of timbres
   reserved in a data source;

   an interface that can be operated to transfer the timbre
   data from the data source to the timbre data memory so that
10   the timbre data memory stores the transferred timbre data;

   a score data memory that stores score data representing
   a music piece;

   a tone generator that is set with a tone generating
   parameter derived from the score data stored in the score
15   data memory for generating tones of the music piece; and

   a performance controller that interprets the score data
   to read out timbre data designated by the score data from the
   timbre data memory for setting the tone generator with the
   read timbre data so that the tone generator can generate the
20   tones having timbres specified by the score data according to
   the read timbre data.

2. The music reproducing apparatus according to claim 1,
   wherein the tone generator can concurrently generate a third
25   number of tones allotted to respective parts of the music
   piece, which are not more than the second number of timbres

available by the timbre data memory, and the performance

controller reads out timbre data corresponding to the third

member of timbres which are assigned to the respective parts

according to the score data.

5

3. An electronic apparatus comprising:

a processor that processes data to execute a task;

a memory device that memorizes data including music data

comprised of timbre data and score data to represent music

10  pieces; and

a music reproduction device that operates according to

the music data under control by the processor to reproduce a

music piece in association with the task executed by the

processor, wherein the music reproduction device comprises:

15  a timbre data memory that has a limited capacity for

storing timbre data corresponding to a first number of

timbres, which is less than a second number of timbres

reserved in the memory device;

an interface that can be operated to transfer the timbre

20  data from the memory device to the timbre data memory so that

the timbre data memory stores the transferred timbre data;

a score data memory that stores score data representing

a music piece;

a tone generator that is set with a tone generating

25  parameter derived from the score data stored in the score

data memory for generating tones of the music piece; and

a performance controller that interprets the score data

to read out timbre data designated by the score data from the

timbre data memory for setting the tone generator with the

read timbre data so that the tone generator can generate the

5    tones having timbres specified by the score data according to

the read timbre data.


4.  The electronic apparatus according to claim 3, wherein

the tone generator can concurrently generate a third number

10   of tones allotted to respective parts of the music piece,

which are not more than the second number of timbres

available by the timbre data memory, and the performance

controller reads out timbre data corresponding to the third

member of timbres which are assigned to the respective parts

15   according to the score data.


5.  The electronic apparatus according to claim 3, further

comprising a communication device that can communicate with

an external database to download therefrom music data into

20   the memory device.


6.  A telephony terminal apparatus having a communication

unit that transmits a signal to a remote location and

receives a signal from the remote location, and a music

25   reproduction unit that can reproduce a music piece in

association with the signal, wherein

the music reproduction unit comprises:

a score data memory that memorizes score data representing a music piece;

a tone generator of a frequency modulation type settable

5   with parameters for generating harmonics by frequency modulation to synthesize a tone; and

a performance controller that sets the tone generator with parameters according to the memorized score data for enabling the tone generator to synthesize tones of the music

10   piece represented by the score data.

7.   The telephony terminal apparatus according to claim 6, wherein the music reproduction unit further comprises a timbre data memory that has a limited capacity for memorizing

15   timbre data corresponding to a predetermined number of timbres, and the performance controller interprets the score data to read out timbre data corresponding to a timbre designated by the score data from the timbre data memory, and sets the tone generator according to the read timbre data to

20   thereby enable the tone generator to synthesize the tones of the music piece having the timbre designated by the score data.

8.   The telephony terminal apparatus according to claim 7,

25   wherein the music reproduction unit further comprises an interface that can transfer data including the timbre data

between the music reproduction unit and other units, the interface being operated for transferring the timbre data to the music reproduction unit so as to load the timbre data memory.

9. The telephony terminal apparatus according to claim 8, further comprising a central processing unit that treats various data and a memory unit that reserves various data including music data composed of score data and timbre data, wherein the interface is operated under control by the central processing unit for transferring the timbre data from the memory unit to the timbre data memory of the music reproduction unit and for transferring the score data from the memory unit to the score data memory of the music reproduction unit.

10. The telephony terminal apparatus according to claim 9, wherein the memory unit reserves timbre data corresponding to a first number of timbres, wherein the timbre data memory of the music reproduction unit memorizes timbre data being transferred from the memory unit and corresponding to a second number of timbres which are less than the first number of timbres, wherein the tone generator can concurrently generate a third number of tones allotted to respective parts of the music piece, which are not more than the second number of timbres available by the timbre data memory, and wherein

the performance controller reads out timbre data from the
timbre data memory corresponding to the third member of
timbres which are assigned to the respective parts according
to the score data.

5

11. The telephony terminal apparatus according to claim 9,
wherein the communication unit can receive a signal
representing either of the score data and the timbre data so
as to download the same into the memory unit.

10

12. A music reproducing apparatus comprising:

a score data memory that has a limited space for storing
a part of score data, which represents a music piece and
which can be provided from a data source;

15      an interface that can be operated to load the score data
from the data source into the score data memory;

a tone generator that is set with a variable parameter
derived from the score data for sequentially generating tones
of the music piece;

20      a performance controller that sequentially retrieves the
score data from the score data memory so as to set the tone
generator with the variable parameter according to the
retrieved score data; and

a memory monitor that detects when a vacant area is

25 created in the limited space of the score data memory upon
sequential retrieval of the score data for operating the

interface to load another part of the score data into the

vacant area, thereby enabling the tone generator to continue

the generating of the tones of the music piece.

5    13.   The music reproducing apparatus according to claim 12,

further comprising a timbre data memory that stores timbre

data corresponding to a number of timbres, wherein the

performance controller reads out timbre data corresponding to

a timbre designated by the score data from the timbre data

10   memory, and sets the tone generator with the read timbre data,

thereby enabling the tone generator to generate the tones of

the music piece having the designated timbre.

14.   An electronic apparatus comprising:

15          a processor that processes data to execute a task;

a memory device that memorizes data including score data

representative of a music piece; and

a music reproduction device that operates according to

the score data under control by the processor to reproduce a

20   music piece in association with the task, wherein the music

reproduction device comprises:

a score data memory that has a limited space for storing

a part of score data, which represents a music piece and

which can be provided from the memory device;

25          an interface that can be operated to load the score data

from the memory device into the score data memory;

a tone generator that is set with a variable parameter

derived from the score data for sequentially generating tones

of the music piece;

a performance controller that sequentially retrieves the

5 score data from the score data memory so as to set the tone

generator with the variable parameter according to the

retrieved score data; and

a memory monitor that notifies the processor when a

vacant area is created in the limited space of the score data

10 memory upon sequential retrieval of the score data, so that

the processor operates the interface to load another part of

the score data from the memory device into the vacant area of

the limited space of the score data memory, thereby enabling

the tone generator to continue the generating of the tones of

15 the music piece.


15. The electronic apparatus according to claim 14, further

comprising a timbre data memory that stores timbre data

corresponding to a number of timbres, wherein the performance

20 controller reads out timbre data corresponding to a timbre

designated by the score data from the timbre data memory, and

sets the tone generator with the read timbre data, thereby

enabling the tone generator to generate the tones of the

music piece having the designated timbre.

25

16. The electronic apparatus according to claim 14, further

comprising a communication device that can communicate with
an external database to download therefrom score data into
the memory device.

5  17.  A method of reproducing a music piece comprising the
steps of:

providing a timbre data memory that has a limited
capacity capable of storing timbre data corresponding to a
first number of timbres, which is less than a second number
10  of timbres reserved in a data source;

operating an interface to transfer the timbre data from
the data source to the timbre data memory so that the timbre
data memory stores the transferred timbre data;

storing score data representing a music piece in a score
15  data memory;

setting a tone generator with a tone generating
parameter derived from the score data stored in the score
data memory for generating tones of the music piece; and

interpreting the score data to read out timbre data
20  designated by the score data from the timbre data memory for
setting the tone generator with the read timbre data so that
the tone generator can generate the tones having timbres
specified by the score data according to the read timbre data.

25  18.  A method of reproducing a music piece from an electronic
apparatus having a processor that processes data to execute a

task, a memory device that memorizes data including music

data comprised of timbre data and score data to represent

music pieces, and a music reproduction device that operates

according to the music data under control by the processor to

5    reproduce a music piece in association with the task executed

by the processor, the method comprising the steps of:

    providing the music reproduction device with a timbre

data memory that has a limited capacity capable of storing

timbre data corresponding to a first number of timbres, which

10    is less than a second number of timbres reserved in the

memory device;

    operating an interface to transfer the timbre data from

the memory device to the timbre data memory so that the

timbre data memory stores the transferred timbre data;

15    storing score data representing a music piece in a score

data memory of the music production device;

    setting a tone generator of the music reproduction

device with a tone generating parameter derived from the

score data stored in the score data memory for generating

20    tones of the music piece; and

    interpreting the score data to read out timbre data

designated by the score data from the timbre data memory for

setting the tone generator with the read timbre data so that

the tone generator can generate the tones having timbres

25    specified by the score data according to the read timbre data.

19. A method of reproducing a music piece by a telephony
terminal apparatus having a communication unit that transmits
a signal to a remote location and receives a signal from the
remote location, and a music reproduction unit that can
5  reproduce a music piece in association with the signal, the
method comprising the steps of:

    providing the music reproduction unit with a score data
memory that memorizes score data representing a music piece;

    providing the music reproduction unit with a tone
10  generator of a frequency modulation type settable with
parameters for generating harmonics by frequency modulation
to synthesize a tone; and

    setting the tone generator with parameters according to
the memorized score data for enabling the tone generator to
15  synthesize tones of the music piece represented by the score
data.


20. A method of reproducing a music piece comprising the
steps of:

20      providing a score data memory that has a limited space
capable of storing a part of score data, which represents a
music piece and which can be provided from a data source;

    operating an interface to load the score data from the
data source into the score data memory;

25      setting a tone generator with a variable parameter
derived from the score data for sequentially generating tones

of the music piece;

sequentially retrieving the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

5        detecting when a vacant area is created in the limited space of the score data memory upon sequential retrieval of the score data for operating the interface to load another part of the score data into the vacant area, thereby enabling the tone generator to continue the generating of the tones of

10   the music piece.

21. A method of reproducing a music piece from an electronic apparatus having a processor that process a data to execute a task, a memory device that memorizes data including score

15   data representative of a music piece and a music reproduction device that operates according to the score data under control by the processor to reproduce a music piece in association with the task, the method comprising the steps of:

20       providing the music reproduction device with a score data memory that has a limited space capable of storing a part of score data, which represents a music piece and which can be provided from the memory device;

operating an interface to load the score data from the

25   memory device into the score data memory;

setting a tone generator of the music reproduction

device with a variable parameter derived from the score data

for sequentially generating tones of the music piece;

sequentially retrieving the score data from the score

data memory so as to set the tone generator with the variable

5 parameter according to the retrieved score data; and

notifying the processor when a vacant area is created in

the limited space of the score data memory upon sequential

retrieval of the score data, so that the processor operates

the interface to load another part of the score data from the

10 memory device into the vacant area of the limited space of

the score data memory, thereby enabling the tone generator to

continue the generating of the tones of the music piece.


22. A machine readable medium for use in a music reproducing

15 apparatus having a processor, the medium containing program

instructions executable by the processor for causing the

music reproducing apparatus to perform a method comprising

the steps of:

preparing a timbre data memory that has a limited

20 capacity capable of storing timbre data corresponding to a

first number of timbres, which is less than a second number

of timbres reserved in a data source;

operating an interface to transfer the timbre data from

the data source to the timbre data memory so that the timbre

25 data memory stores the transferred timbre data;

storing score data representing a music piece in a score

data memory;

setting a tone generator with a tone generating

parameter derived from the score data stored in the score

data memory for generating tones of the music piece; and

5          interpreting the score data to read out timbre data

designated by the score data from the timbre data memory for

setting the tone generator with the read timbre data so that

the tone generator can generate the tones having timbres

specified by the score data according to the read timbre data.

10

23.    A machine readable medium for use in an electronic

apparatus having a processor that processes data to execute a

task, a memory device that memorizes data including music

data comprised of timbre data and score data to represent

15   music pieces, and a music reproduction device that operates

according to the music data under control by the processor to

reproduce a music piece in association with the task executed

by the processor, the medium containing program instructions

executable by the processor for causing the electronic

20   apparatus to carry out a method comprising the steps of:

allotting the music reproduction device with a timbre

data memory that has a limited capacity capable of storing

timbre data corresponding to a first number of timbres, which

is less than a second number of timbres reserved in the

25   memory device;

operating an interface to transfer the timbre data from

the memory device to the timbre data memory so that the

timbre data memory stores the transferred timbre data;

loading score data representing a music piece in a score

data memory of the music reproduction device;

5      setting a tone generator of the music reproduction

device with a tone generating parameter derived from the

score data loaded in the score data memory for generating

tones of the music piece; and

interpreting the score data to read out timbre data

10    designated by the score data from the timbre data memory for

setting the tone generator with the read timbre data so that

the tone generator can generate the tones having timbres

specified by the score data according to the read timbre data.


15    24.  A machine readable medium for use in a telephony

terminal apparatus having a central processing unit, a

communication unit that transmits a signal to a remote

location and receives a signal from the remote location, and

a music reproduction unit that can reproduce a music piece in

20    association with the signal, the medium containing program

instructions executable by the central processing unit for

causing the telephony terminal apparatus to perform a method

comprising the steps of:

allotting the music reproduction unit with a score data

25    memory that memorizes score data representing a music piece;

providing the music reproduction unit with a tone

generator of a frequency modulation type settable with

parameters for generating harmonics by frequency modulation

to synthesize a tone; and

setting the tone generator with parameters according to

5    the memorized score data for enabling the tone generator to

synthesize tones of the music piece represented by the score

data.


25.  A machine readable medium for use in a music reproducing

10   apparatus having a processor, the medium containing program

instructions executable by the processor for causing the

music reproducing apparatus to perform a method comprising

the steps of:

providing a score data memory that has a limited space

15   capable of storing a part of score data, which represents a

music piece and which can be provided from a data source;

operating an interface to load the score data from the

data source into the score data memory;

setting a tone generator with a variable parameter

20   derived from the score data for sequentially generating tones

of the music piece;

sequentially retrieving the score data from the score

data memory so as to set the tone generator with the variable

parameter according to the retrieved score data; and

25       detecting when a vacant area is created in the limited

space of the score data memory upon sequential retrieval of

the score data for operating the interface to load another
part of the score data into the vacant area, thereby enabling
the tone generator to continue the generating of the tones of
the music piece.

5

26. A machine readable medium for use in an electronic
apparatus having a processor that processes data to execute a
task, a memory device that memorizes data including score
data representative of a music piece and a music reproduction
10 device that operates according to the score data under
control by the processor to reproduce a music piece in
association with the task, the medium containing program
instructions executable by the processor for causing the
electronic apparatus to perform a method comprising the steps
15 of:
        allotting the music reproduction device with a score
data memory that has a limited space capable of storing a
part of score data, which represents a music piece and which
can be provided from the memory device;
20      operating an interface to load the score data from the
memory device into the score data memory;
        setting a tone generator of the music reproduction
device with a variable parameter derived from the score data
for sequentially generating tones of the music piece;
25      sequentially retrieving the score data from the score
data memory so as to set the tone generator with the variable

parameter according to the retrieved score data; and

notifying the processor when a vacant area is created in

the limited space of the score data memory upon sequential

retrieval of the score data, so that the processor operates

the interface to load another part of the score data from the

memory device into the vacant area of the limited space of

the score data memory, thereby enabling the tone generator to

continue the generating of the tones of the music piece.

# INTERNATIONAL SEARCH REPORT

## A. CLASSIFICATION OF SUBJECT MATTER
IPC 7    G10H1/00      G10H1/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7    G10H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP 0 837 451 A (YAMAHA CORP)<br>22 April 1998 (1998-04-22)<br><br>column 2, line 29 – line 49<br>column 6, line 12 – line 31<br>column 10, line 20 –column 12, line 45;<br>figures 1-3<br>--- | 1,3,5,<br>17,18,<br>22,23 |
| A | EP 0 531 670 A (RICOS KK)<br>17 March 1993 (1993-03-17)<br><br>column 4, line 11 –column 5, line 30;<br>figure 1<br>---<br><br>-/-- | 12,14,<br>20,21,<br>25,26 |

| X | Further documents are listed in the continuation of box C. | | X | Patent family members are listed in annex. |
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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 6 November 2000 | 14/11/2000 |

| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Authorized officer<br><br>Pulluard, R |
|---|---|

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1

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category ° | Citation of document, with indication,where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP 0 372 678 A (TSUMURA MIHOJI)<br>13 June 1990 (1990-06-13)<br><br>column 13, line 50 -column 15, line 23;<br>figures 7-9<br>----- | 3,5,12,<br>14,18,<br>20,21,<br>23,25,26 |

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
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# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| Applicant's or agent's file reference<br><br>H7353WO | **FOR FURTHER ACTION** | see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. |
|---|---|---|
| International application No.<br><br>PCT/JP 00/05199 | International filing date *(day/month/year)*<br><br>03/08/2000 | (Earliest) Priority Date *(day/month/year)*<br><br>05/08/1999 |

| Applicant<br><br>YAMAHA CORPORATION |
|---|

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of \_\_\_\_\_**3**\_\_\_\_\_ sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

    a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

    [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

    b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

    [ ] contained in the international application in written form.

    [ ] filed together with the international application in computer readable form.

    [ ] furnished subsequently to this Authority in written form.

    [ ] furnished subsequently to this Authority in computer readble form.

    [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

    [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of Invention is lacking** (see Box II).

4. With regard to the **title,**

    [X] the text is approved as submitted by the applicant.

    [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

    [X] the text is approved as submitted by the applicant.

    [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. \_\_\_**3**_____

    [X] as suggested by the applicant.

    [ ] because the applicant failed to suggest a figure.

    [ ] because this figure better characterizes the invention.

    [ ] None of the figures.

# INTERNATIONAL SEARCH REPORT

## A. CLASSIFICATION OF SUBJECT MATTER
IPC 7    G10H1/00       G10H1/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7    G10H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP 0 837 451 A (YAMAHA CORP) 22 April 1998 (1998-04-22) <br><br> column 2, line 29 – line 49 <br> column 6, line 12 – line 31 <br> column 10, line 20 –column 12, line 45; figures 1-3 <br> --- | 1,3,5, 17,18, 22,23 |
| A | EP 0 531 670 A (RICOS KK) 17 March 1993 (1993-03-17) <br><br> column 4, line 11 –column 5, line 30; figure 1 <br> --- <br> -/-- | 12,14, 20,21, 25,26 |

[X] Further documents are listed in the continuation of box C.      [X] Patent family members are listed in annex.

° Special categories of cited documents :

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 6 November 2000 | 14/11/2000 |

| Name and mailing address of the ISA <br> European Patent Office, P.B. 5818 Patentlaan 2 <br> NL – 2280 HV Rijswijk <br> Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, <br> Fax: (+31–70) 340–3016 | Authorized officer <br><br> Pulluard, R |
|---|---|

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category ° | Citation of document, with indication,where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP 0 372 678 A (TSUMURA MIHOJI) 13 June 1990 (1990-06-13)<br><br>column 13, line 50 -column 15, line 23; figures 7-9<br>----- | 3,5,12, 14,18, 20,21, 23,25,26 |

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on patent family members

International Application No

JP 00/05199

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